PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION.

Improvements in Reinforced Concrete Structures and in the Method or System of Building the same.

We, DOUGLAS GORDON COMYN, of Glenhurst, Colway Road, Wolverhampton, in the County of Stafford, Public Works Contractor, and THOMAS LEA, of Rookery House, Lanesfield, near Wolverhampton, aforesaid, Civil Engineer, do hereby declare the nature of this invention to be as follows:—

This invention has reference to reinforced concrete structures and to the method or system of building the same. By this invention said structures are rendered entirely damp proof and the use of shuttering, moulds, shoring or any other form of temporary support during erection is dispensed with. Moreover even distribution of reinforcements is assured and the whole construction is bonded and secured together and rendered perfectly damp proof as the erection proceeds, thus effecting considerable economy in time and materials, speeding up construction and ensuring great strength of the finished structure.

Our said invention is applicable to all kinds of residential and industrial buildings such as warehouses, factories, motor garages, tramway sheds, and the like, also to reservoirs, tanks, concrete bridge work, and other buildings of public and private utility.

According to this invention a ferro concrete structure has the upright walls with the pillars, buttresses, or the like built up of hollow concrete blocks of convenient size (the holes through such blocks being vertical) laid in horizontal courses, the holes in the blocks of any course matching the holes in the adjacent courses above and below. Upright reinforcement is provided in the pillars or buttresses and also if necessary in the walls by vertical iron or steel bars situated in the holes of the blocks which are filled in with mass concrete or other suitable liquid cementitious composition. The pillars and supports and the walls of the structure are also reinforced laterally or horizontally and a connected or bonded reinforcement is established at intervals throughout the structure by means of steel or other wire or strips which are bound laterally and diagonally round the four or other number of upright corner reinforcement bars of the pillars or buttresses, these wires or strips being situated in any of the courses as may be necessary, and in addition steel or other wire or strips are situated in the courses of the walls or panels and are connected to the lateral reinforcements of the next pillars or supports and this is continued along the whole structure of the building. Thus there is a connected "course" lateral reinforcement connected and bonded with both upright and lateral reinforcement of supports and running entirely round the building. Even distribution of the reinforcement and great stability and strength are thus secured. In order to provide intermural damp proofing the panels or walls between and through the pillars or buttresses are erected by two rows of concrete blocks, or two rows of concrete slabs, or one row of concrete blocks and one row of slabs, according to the thickness of the wall required and these two rows are so placed that there is an intermediate vertical space or cavity between them varying in thickness accord-

[*Price* 1/-]

ing to requirements say from one quarter of an inch to three quarters of an inch, and this vertical space is filled in with suitable bitumastic or pitch damp course composition. Thus the walls or panels between and through the pillars and buttresses are provided for their entire length and height with a vertical damp proof and non-conducting intermural protection rendering the inside section of the wall completely free from induction of moisture through the outer section.

The preferred method of building the reinforced concrete damp proof structure above described is as follows:—

The building of the upright pillars or buttresses or supports is carried up concurrently with the building of the walls or panels so that at any given period of erection the pillars or supports and the walls and panels are the same height in the section being erected. After one or more courses have been laid the upright reinforced rods or bars are introduced into the vertical holes in the pillars or buttresses and suitably supported and tied together by the lateral reinforcement wires or strips being bound laterally and diagonally round said uprights bars or rods as aforesaid to tie them together, and also the lateral or horizontal reinforcement wires or strips are laid and securely fastened to the lateral reinforcements of the pillars or buttresses so as to tie them together and to provide a connected course reinforcement entirely round the building. These reinforcement wires or strips are introduced either in every course or in alternate courses or at other intervals as may be necessary.

At regular or other periods or distances of erection the completion of the pillars or buttresses and of the upright or vertical reinforcements is secured by all the said holes in the concrete blocks being filled in with liquid concrete as aforesaid and also the damp proof material is run into the continuous vertical cavity of the walls.

It will be seen that by the system of construction above described each course of the structure is or can be completely finished reinforced and rendered damp-proof as the work proceeds, and moreover the pillars, supports or buttresses and the walls or panels are self supporting and require no temporary assistance in the shape of timbering, shuttering, moulding or the like, thus there is no need for the use of materials except those actually forming the permanent structure.

Dated this 20th day of May, 1919.

CHARLES BOSWORTH KETLEY,
Chartered Patent Agent,
128, Colmore Row, Birmingham,
Agent for the Applicants.

COMPLETE SPECIFICATION.

Improvements in Reinforced Concrete Structures and in the Method or System of Building the same.

We, DOUGLAS GORDON COMYN, of Glenhurst, Colway Road, Wolverhampton, in the County of Stafford, Public Works Contractor, and THOMAS LEA, of Rookery House, Lanesfield, near Wolverhampton, aforesaid, Civil Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the followng statement:—

This invention has reference to reinforced concrete structures and to the method or system of building the same. By this invention said structures are rendered entirely damp proof and the use of shuttering, moulds, shoring or any other form of temporary support during erection is dispensed with. Moreover distribution of reinforcements as required or may be necessary for the building under construction is assured and the whole construction is bonded and secured together and rendered perfectly damp proof as the erection proceeds, thus effecting considerable economy in time and materials, speeding up construction and ensuring great strength of the finished structure.

Our said invention is applicable to all kinds of residential and industrial buildings such as warehouses, factories, motor garages, tramway sheds and the like, also to reservoirs, tanks, concrete bridge work, and other buildings of public and private utility.

It has previously been proposed to construct hollow damp-proof walls of the kind having outer and inner sections with intervening ventilating spaces wherein the latter are separated by vertical face to face flat contact portions of the blocks

or bricks fitted with flat damp-proof material, the sections or blocks of the walls being keyed together in any suitable manner as by grooved and tongued joints or by tie bars or the like.

According to our invention a ferro concrete structure has the upright walls with the pillars, buttresses, or the like built up of hollow concrete blocks of convenient size (the holes through such blocks being vertical) laid in horizontal courses, the holes in the blocks of any course coinciding wholly or in part with the holes in the courses above and below, and in combination therewith upright reinforcement is provided in the pillars or buttresses and also if necessary in the walls by vertical iron or steel bars situated in the vertical holes of the blocks which are filled in with mass concrete or other suitable liquid cementitious composition so that the whole becomes a complete reinforced and solid erection, and the pillars and supports and the walls of the structure are also reinforced laterally or horizontally and a connected or bonded reinforcement is thereby established at intervals throughout the structure, by means of steel or other wire or metal strips which are bound laterally and diagonally round the four or other number of upright corner reinforcement bars of the pillars or buttresses, these wires or strips being situated in any of the courses as may be necessary, and in addition steel or other wire or strips are situated in the courses of the walls or panels and are connected to the lateral reinforcements of the next pillars or supports and this is continued along the whole structure of the building. Thus there is a connected "course" lateral reinforcement connected and bonded with both upright and lateral reinforcement of supports and running entirely round the outside walls and also across any division walls of the building. Even distribution of the reinforcement and great stability and strength are thus secured. In order to provide intermural damp proofing the panels or walls, combined with and between and through the said reinforced pillars or buttresses, are erected by two rows of concrete blocks, or two rows of concrete slabs, or one row of concrete blocks and one row of slabs, according to the thickness of the wall required, and these two rows are so placed that there is an intermediate continuous narrow vertical space between them varying in thickness according to requirements say from one quarter of an inch to one inch and a half, which vertical space is as the work proceeds entirely filled in with suitable bitumastic or pitch damp course composition. Thus the walls or panels between and through the said reinforced pillars and buttresses constructed as hereinbefore described are provided for their entire length and height with a continuous vertical damp proof and non-conducting intermural protection rendering the inside section of the wall completely free from induction of moisture through the outer section.

Our invention is illustrated by the accompanying drawings of which:—

Fig. 1 is a front elevation of a portion of a ferro concrete building constructed in accordance with this invention;

Fig. 2 is a plan of the same;

Fig. 3 is a plan of the concrete blocks forming a portion of one course at one of the pillars and connecting walls of the structure, and

Fig. 4 is a plan of the concrete blocks in the courses immediately above and below the blocks shewn in Fig. 3;

Fig. 5 is a front elevation of a continuation of the same building shewn in Fig. 1;

Fig. 6 is a plan of the same;

Fig. 7 is a front elevation on a larger scale of one of the concrete blocks used in the building shewn by the preceding figures;

Fig. 8 is an end elevation of the same block, and

Fig. 9 is a plan of the same.

The concrete blocks forming the outer courses of the wall are marked A and the concrete blocks forming the inner courses of the walls are marked B, and they are similar to those marked A. One of the blocks A is shewn separately in Figures 7, 8, and 9 where it will be seen that it has two vertical oblong holes marked respectively 1 and 2 extending through it for the reception of the vertical reinforcement bars 8 and it also has a longitudinal trough section groove 3 in its top face and a corresponding longitudinal groove 4 in its bottom face to form a key for the mortar or cement and to receive the longitudinal reinforcement wires or strips. Said blocks are also provided with corresponding vertical end grooves 6, 7, to form keys as aforesaid.

The concrete blocks forming the courses in the pillars or supports and the portions of the wall which are bonded into them are shewn separately in plan by Figs. 3 and 4 where it will be seen that some of the blocks 9 are shaped so as to form about one fourth of the area of the pillar and one half of one of the concrete blocks and these in each course are combined

with another block 10 which covers one half of the area of the pillar and they are all made with suitable oblong holes 11 for the reception of the reinforcement bars 8. In the portion of the wall shewn in Figs. 1 and 2 a window opening C is shewn of which D is the concrete window sill which at its ends is made as are the concrete blocks with oblong vertical holes for the reception of the ends of the reinforcement bars 9.

In Fig. 5 a doorway E is shewn, the blocks A at the ends of the step being also made with vertical holes for the reception of the vertical reinforcement bars 8.

The preferred method of building the reinforced concrete damp-proof structure above in part described is as follows:— The building of the upright pillars or buttresses F is carried up concurrently with the building of the walls or panels between the pillars or buttresses so that at any given period of erection the pillars or buttresses F and the intermediate walls or panels are as shewn in Figs. 1 and 5 of the same height in the section being erected.

After one or more of the courses have been laid in the building and the pillars or buttresses and intermediate walls the upright reinforcement bars or rods 8 are introduced into the vertical holes in the concrete blocks and said bars are suitably supported and tied together by the lateral reinforcement wires or strips 12, 13, being bound laterally and diagonally round the upright bars or rods 8 to tie them together and also the lateral or horizontal reinforcement wires or strips 12, 13, are led along and securely fixed to the lateral reinforcements of the pillars or buttresses so as to tie them together and provide a connected course reinforcement entirely round the outside walls and also across any divisional walls of the building. These reinforcement wires or strips 12, 13, are introduced either in every course or in alternate courses or at other intervals as may be necessary.

For instance in the arrangement shewn on our drawings there are two vertical reinforcement bars 8 inserted through the vertical openings in the blocks near the sides of the window opening and door way and in each of the pillars or buttresses F there are four vertical reinforcement bars 8 inserted down the vertical holes of the concrete blocks 9, 10, composing the same. The horizontal reinforcement wires or strips 12, 13, are bent round these upright bars 8 and carried diagonally and so as to cross over and then are straight for a short distance along the horizontal grooves 3, 4, of the blocks and round the other vertical reinforcement rods 8 of the pillars or buttress F and then led away through the horizontal passages between the courses in the continuation of the wall and in the cross walls so as thereby to tie the pillars or buttresses and the walls together as aforesaid and provide a connected course reinforcement throughout the building.

It will be evident that the arrangement of the horizontal reinforcement wires 12, 13, can be considerably varied within the scope of our invention as can also the number and arrangement of vertical reinforcement bars 8 employed.

At regular or other periods or distances of erection the completion of the pillars or buttresses and the walls and of the upright or vertical reinforcements is secured by all the vertical holes in the concrete blocks forming the pillars or buttresses and also those other vertical holes such as at the sides of the windows and doorway in which the vertical bars 8 are situated, being filled in with liquid concrete as before stated, and also the damp proof material at 14 is run into the continuous vertical cavity of the walls so as to provide the continuous vertical intermural damp proofing as before stated and which is shewn as a thick black line in our drawings.

It will be seen that by the system of construction above described each course of the structure is or can be completely finished, reinforced and rendered damp proof as the work proceeds and moreover the pillars, supports or buttresses and the walls or panels are self supporting and require no temporary assistance in the shape of timbering, shuttering, moulding or the like, thus there is no need for the use of materials except those actually forming the permanent structure.

It will be understood that when the building is such that no pillars or buttresses are required, then the vertical reinforcement bars will be inserted at necessary positions in the end blocks of the walls and also at certain intermediate positions and the horizontal reinforcement wires or strips 12, 13, will be employed between the courses or between some of them and wound round the vertical bars and across at various points so as to properly tie together the two vertical courses of which the wall is composed by forming a proper vertical and horizontal reinforcement as aforesaid.

Having now particularly described and ascertained the nature of our said inven-

tion and in what manner the same is to be performed, we declare that what we claim is:—

1. A reinforced concrete structure in which the upright walls, with or without pillars, buttresses or the like, are built up of concrete blocks laid in horizontal courses so as to form a continuous vertical cavity which is filled with damp proof substance, said concrete blocks having vertical holes in some of which are fixed vertical reinforcement bars in combination with horizontal reinforcement wires or strips binding the vertical reinforcement bars and blocks and damp proofing together and forming a connected or bonded reinforcement throughout the structure, substantially as set forth.

2. The improved method or system of building reinforced concrete structures substantially as hereinbefore described with reference to the accompanying drawings.

3. A reinforced concrete structure constructed in the manner substantially as hereinbefore described and illustrated by the accompanying drawings.

Dated this 19th day of November, 1919.

CHARLES BOSWORTH KETLEY,
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128, Colmore Row, Birmingham.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1920.

[This Drawing is a reproduction of the Original on a reduced scale.]

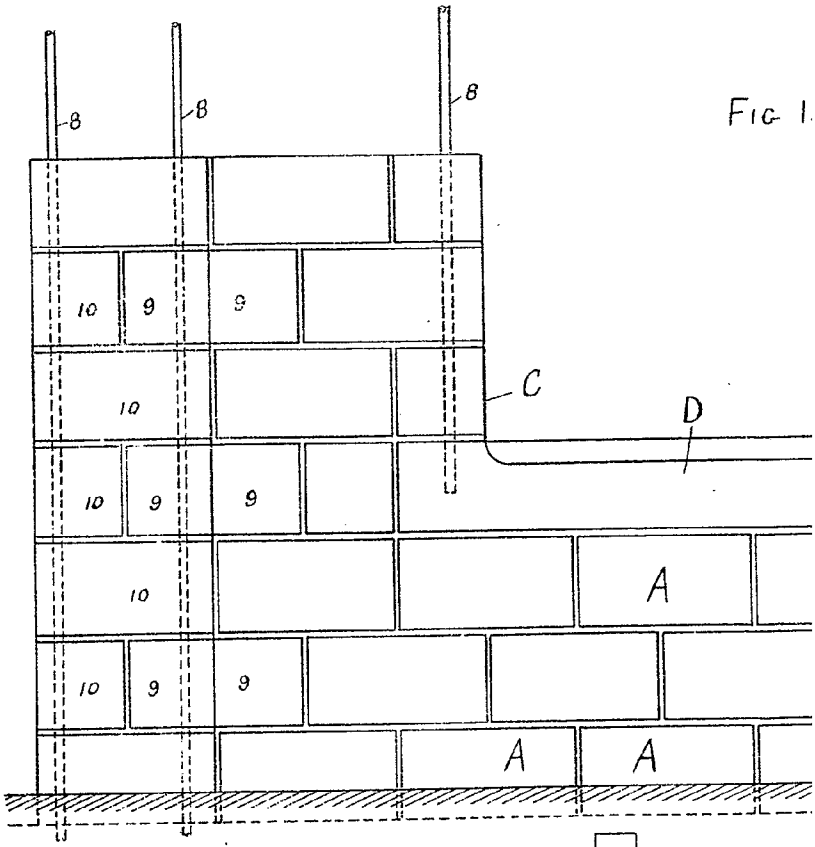


FIG. 1.

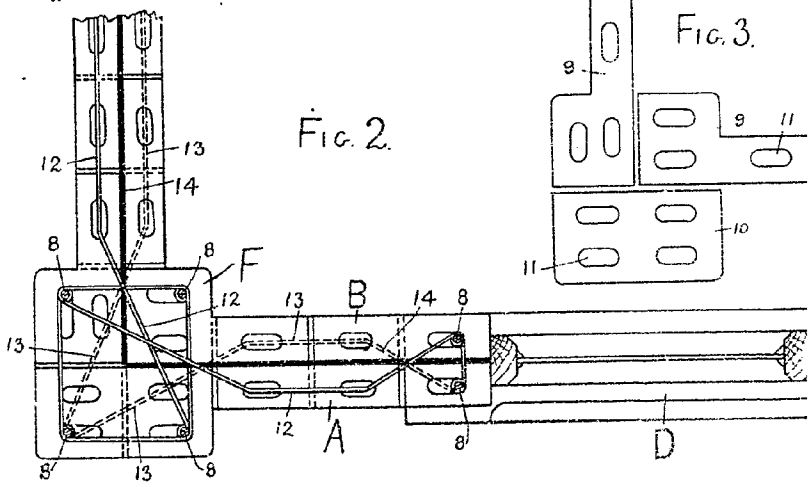


FIG. 2.

FIG. 3.

(3 SHEETS)
SHEET 1.

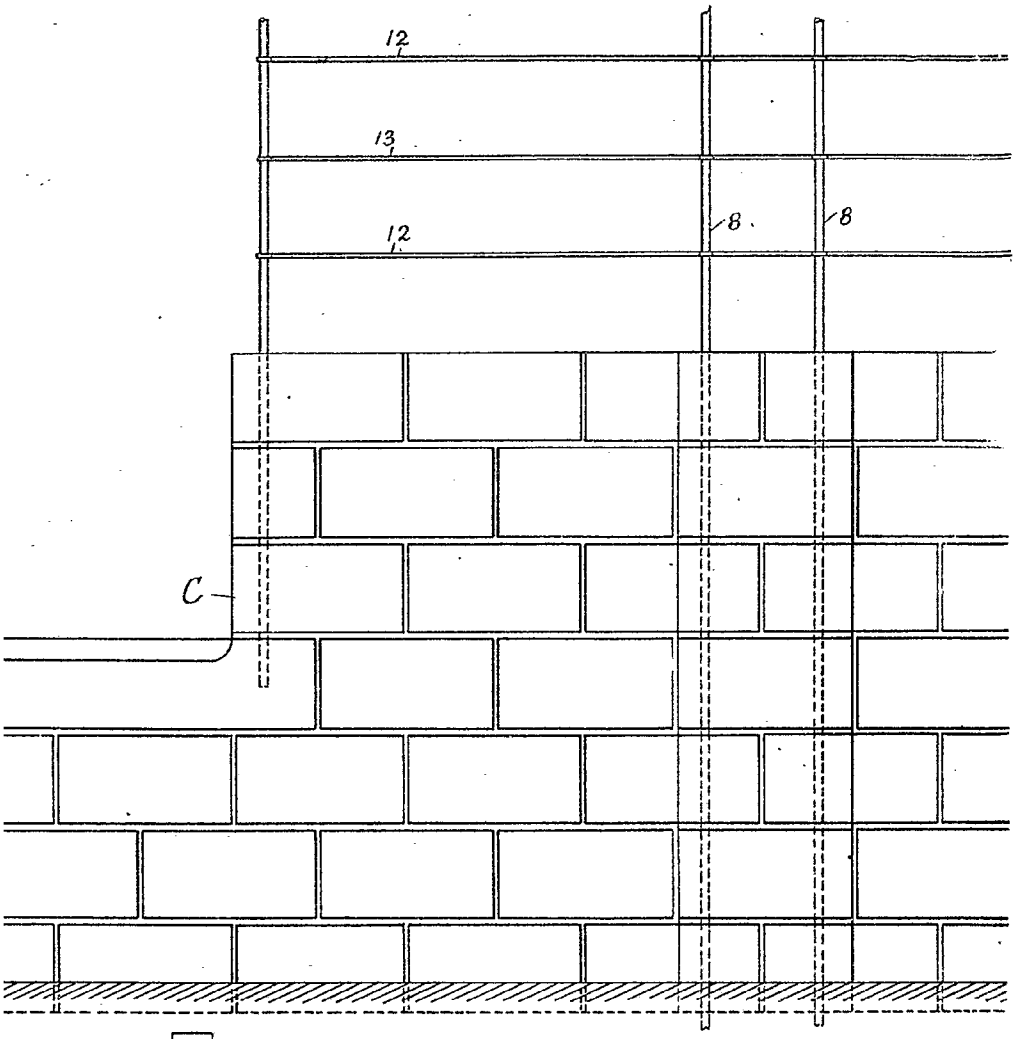
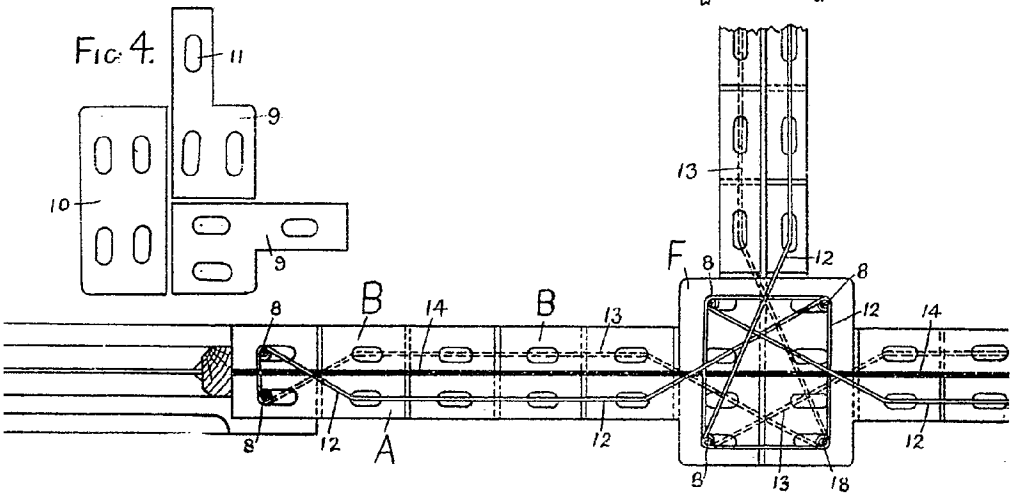


FIG. 4.



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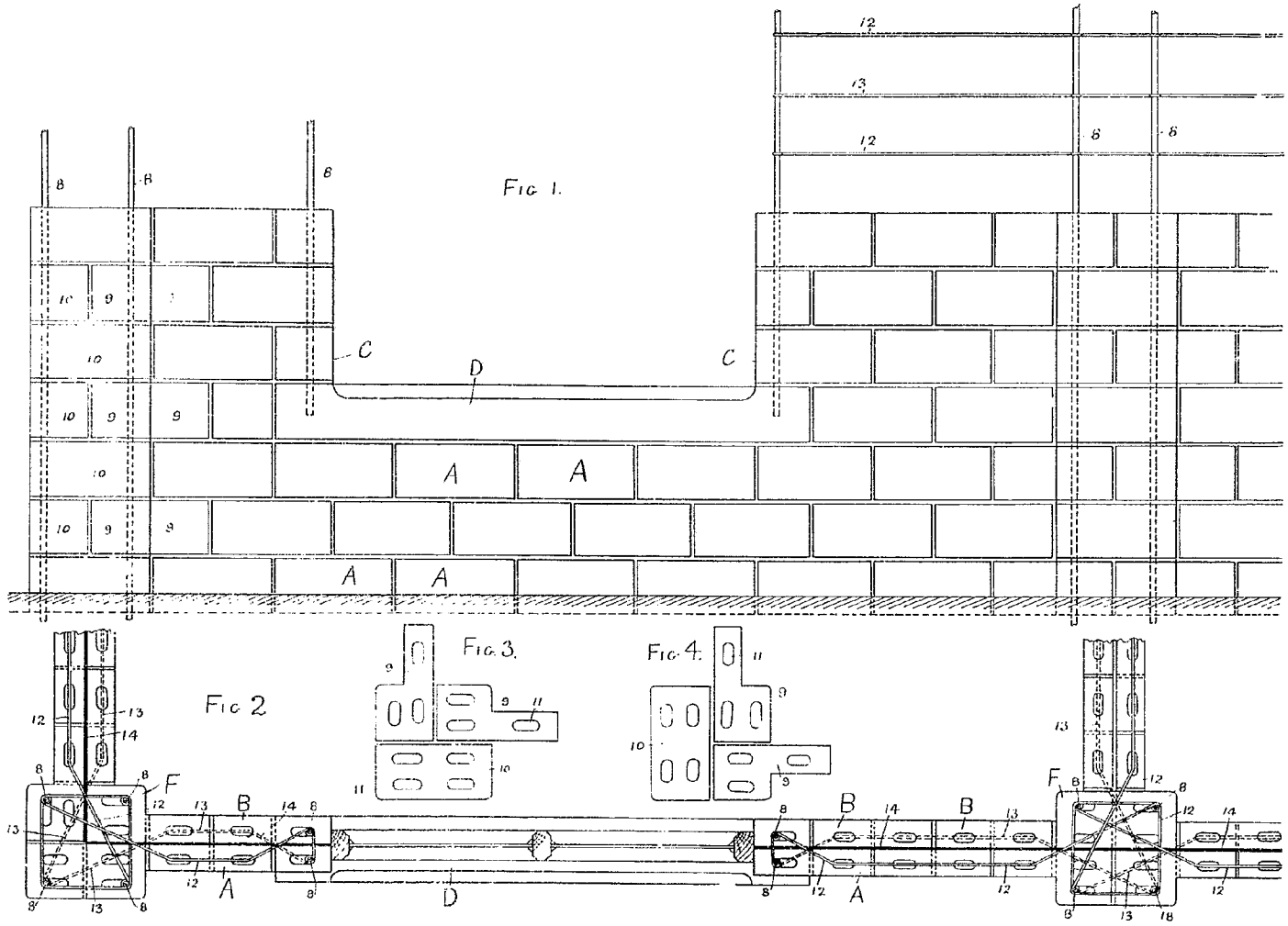
[This Drawing is a reproduction of the Original on a reduced scale]



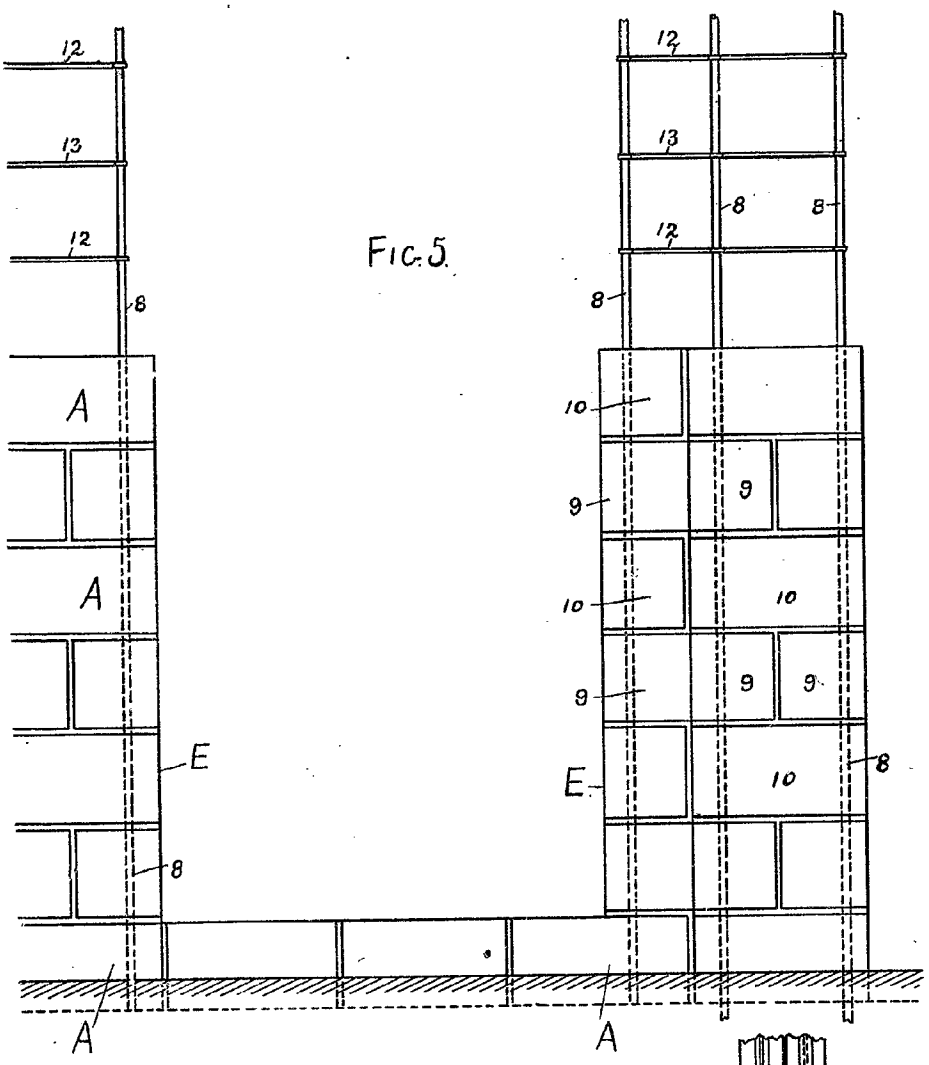

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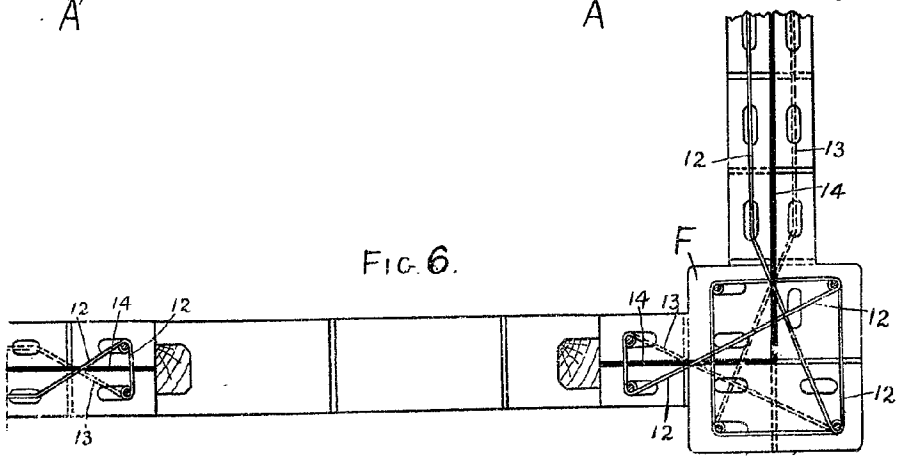
FIG. 5.


12
13
14
F
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13
12

FIG. 6.

FIG. 7.

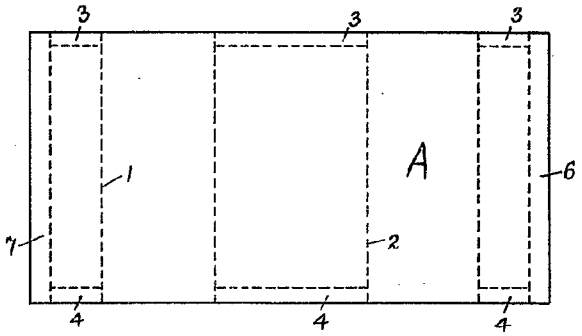


FIG. 8.

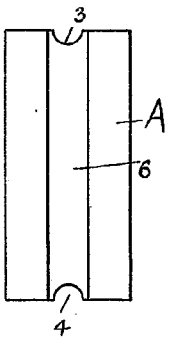
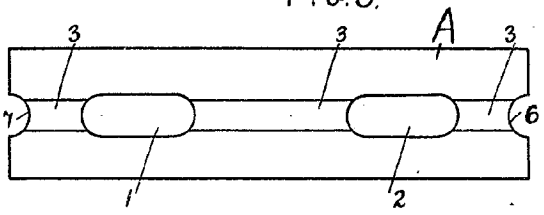


FIG. 9.



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